Is between-sex convergence also happening in lifespan disparity?

Decomposing sex differences in lifespan disparity by causes of death in Switzerland?

Mathias Voigt [1] Adrien Remund [2] Rose van der Linden [3]
Michel Oris [3]

[1]Center for Humanities and Social Sciences (CSIC-CCHS)

[2]Population Research Center, University of Groningen

[3]Centre for the Interdisciplinary Study of Gerontology and Vulnerability, University of Geneva

June 6, 2019

Motivation

- How are sex differences in life expectancy related to those in life span disparity?
- Has the "new" convergence also occurred in terms of disparity?
- How are the two measures affected by changes in the cause of death distribution?

Motivation

- How are sex differences in life expectancy related to those in life span disparity?
- Has the "new" convergence also occurred in terms of disparity?
- How are the two measures affected by changes in the cause of death distribution?

Sex Differences

- Biological: hormonal, chromosomes etc.
- Behavioral: diets, alcohol, smoking, type-A behavior
- External/Socio-cultural: distribution of labor, role in conflicts, environment

Convergence in e_0 and lifespan disparity

Switzerland

- Second highest life expectancy worldwide in 2016 (83.3 years)
- Highest male life expectancy at birth (81.2 years)
  - Smoking patterns (26.9% males, 19.7% females)
  - Not actively involved in the world wars

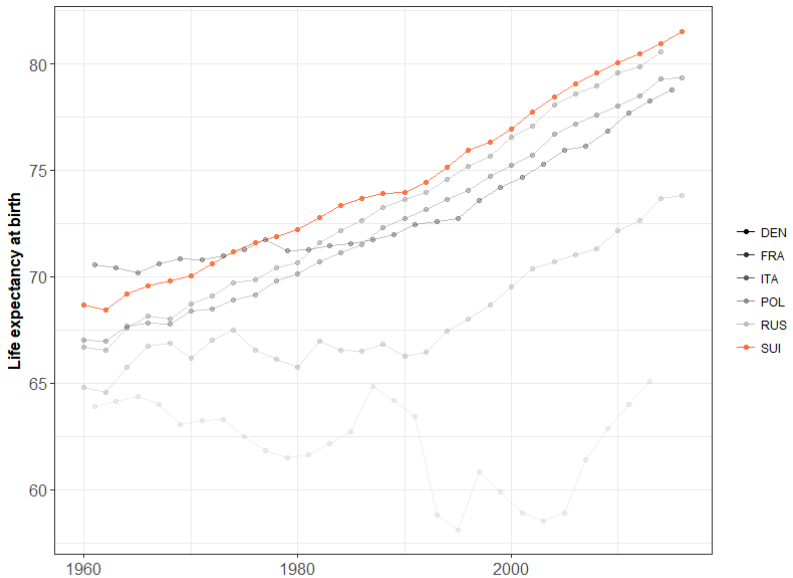


Figure: Male Life Expectancy at Birth (source: HMD)

Sex differences in Life Expectancy at Birth and $e^{\dagger}$

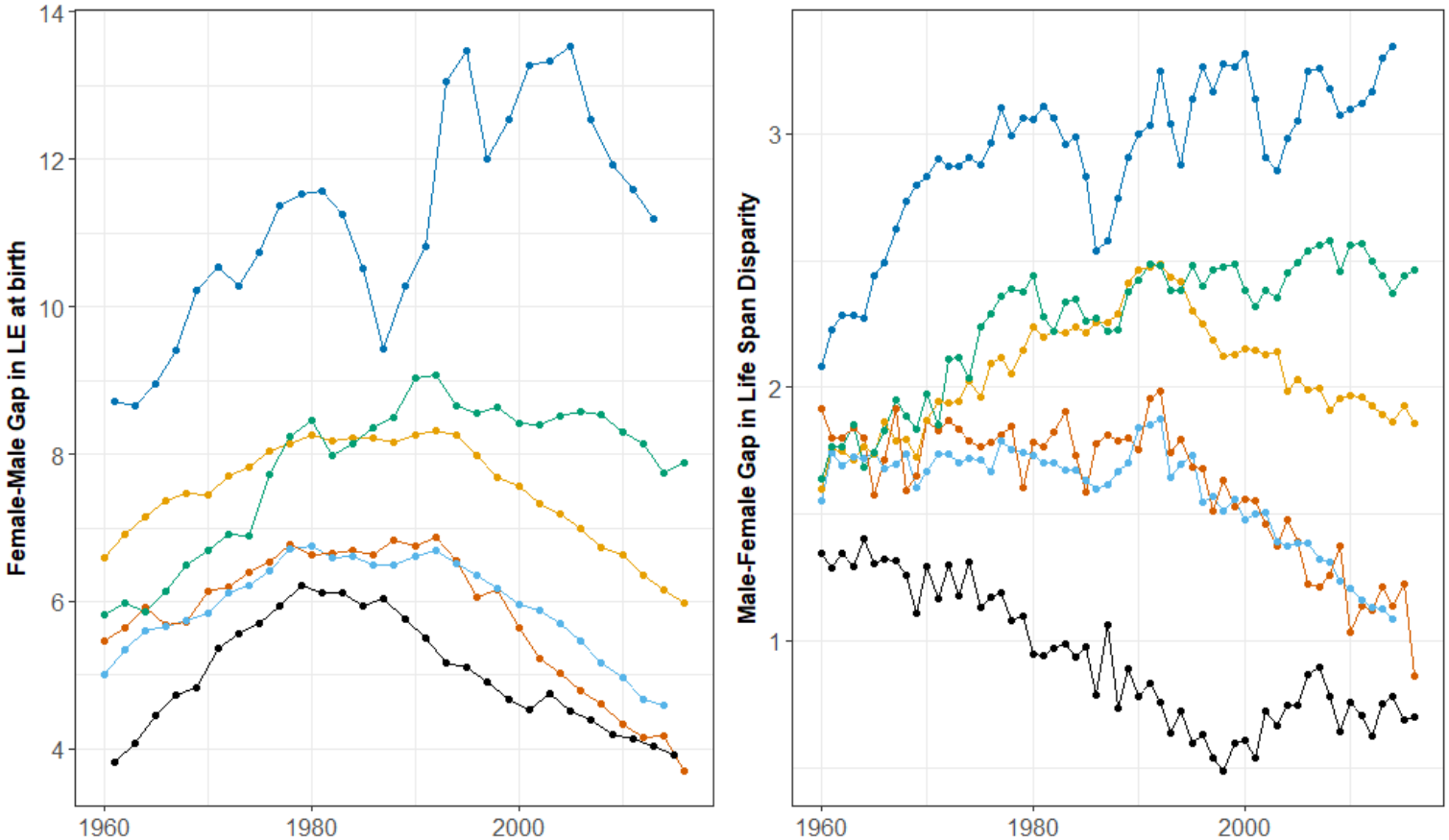


Figure: Sex gap in life expectancy at birth (left panel) and lifespan disparity ($e^{\dagger}$ - right) for selected countries for 1960-2015 (source: HMD)

Sex differences in Life Expectancy at Birth and $e^{\dagger}$

Switzerland

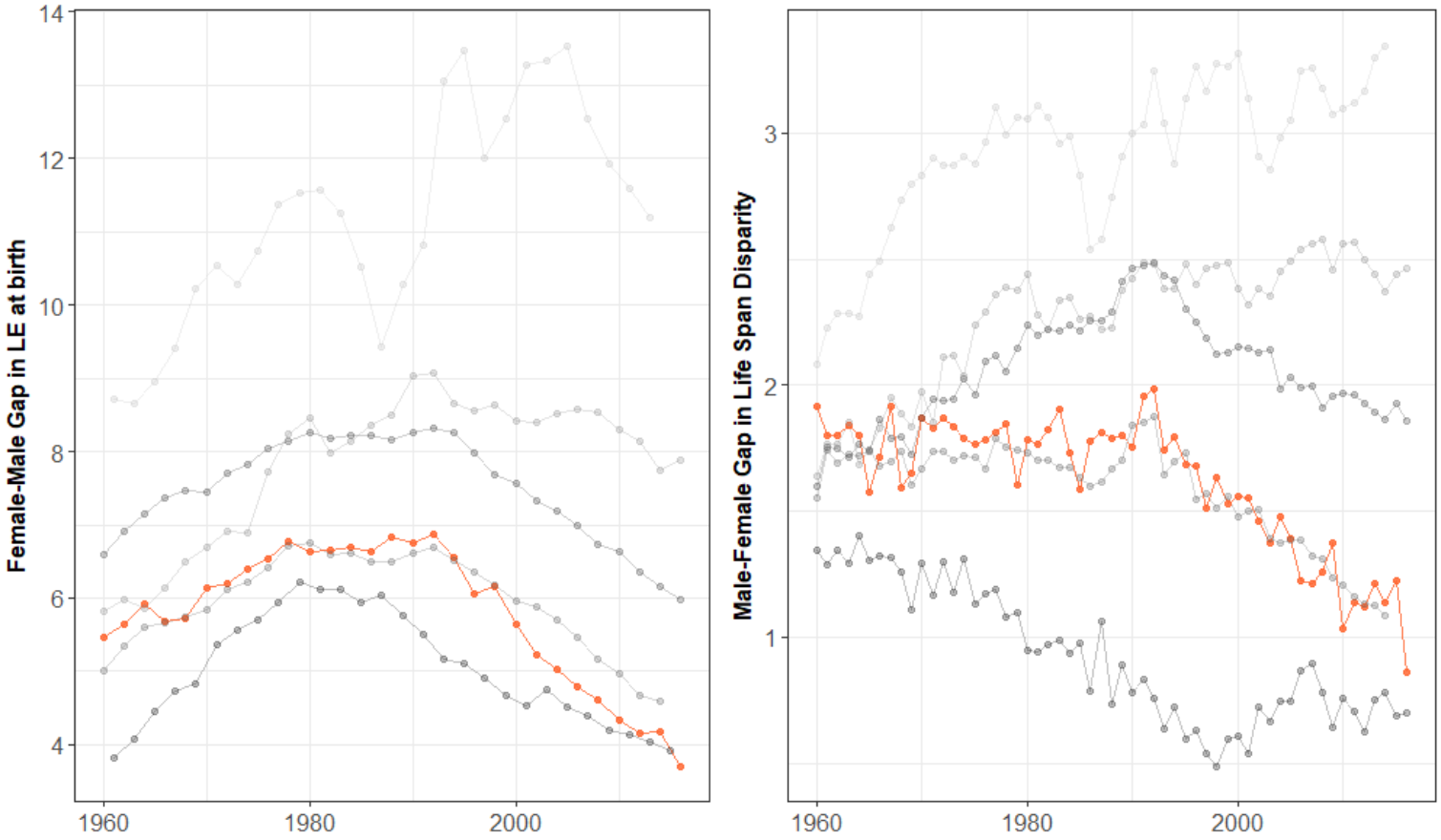


Figure: Sex gap in life expectancy at birth (left panel) and lifespan disparity ($e^{\dagger}$ - right) for Switzerland for 1960-2015 (source: HMD)

Sex differences in Life Expectancy at Birth and $e^{\dagger}$

Denmark

Figure: Sex gap in life expectancy at birth (left panel) and lifespan disparity ($e^{\dagger}$ - right) for Denmark for 1960-2015 (source: HMD)

WHO Mortality Database

- Mortality data by country, year, age, sex and cause of death (from 1950 onwards)
- Cause-of-death data coded according to ICD (used here ICD10 only)
- Reported annually by Member States from civil registration systems

WHO Mortality Database

- Mortality data by country, year, age, sex and cause of death (from 1950 onwards)
- Cause-of-death data coded according to ICD (used here ICD10 only)
- Reported annually by Member States from civil registration systems

Decomposition by Step-Wise Replacement Algorithm

Total change in the index variable (e_0, $e^\dagger$) as sum of sequential replacements of age-specific rates from 0 to ω

- life expectancy is a non-linear aggregate of a.s. death rates
- difference of a.s. event rates for two populations at time T ($f(m_A)$) and $f(m_B)$ can be decomposed by age

Causes of Death

WHO Mortality Database - ICD 10

Cause Group	**Causes**
Smoking related	lung cancer, respiratory diseases etc.
Obesity related	diabetes type 1 and 2
Alcohol related	liver cirrhosis, alcohol poisoning etc.
Transport related	traffic accidents
Suicide	

Age - CoD Decomposition of e_0

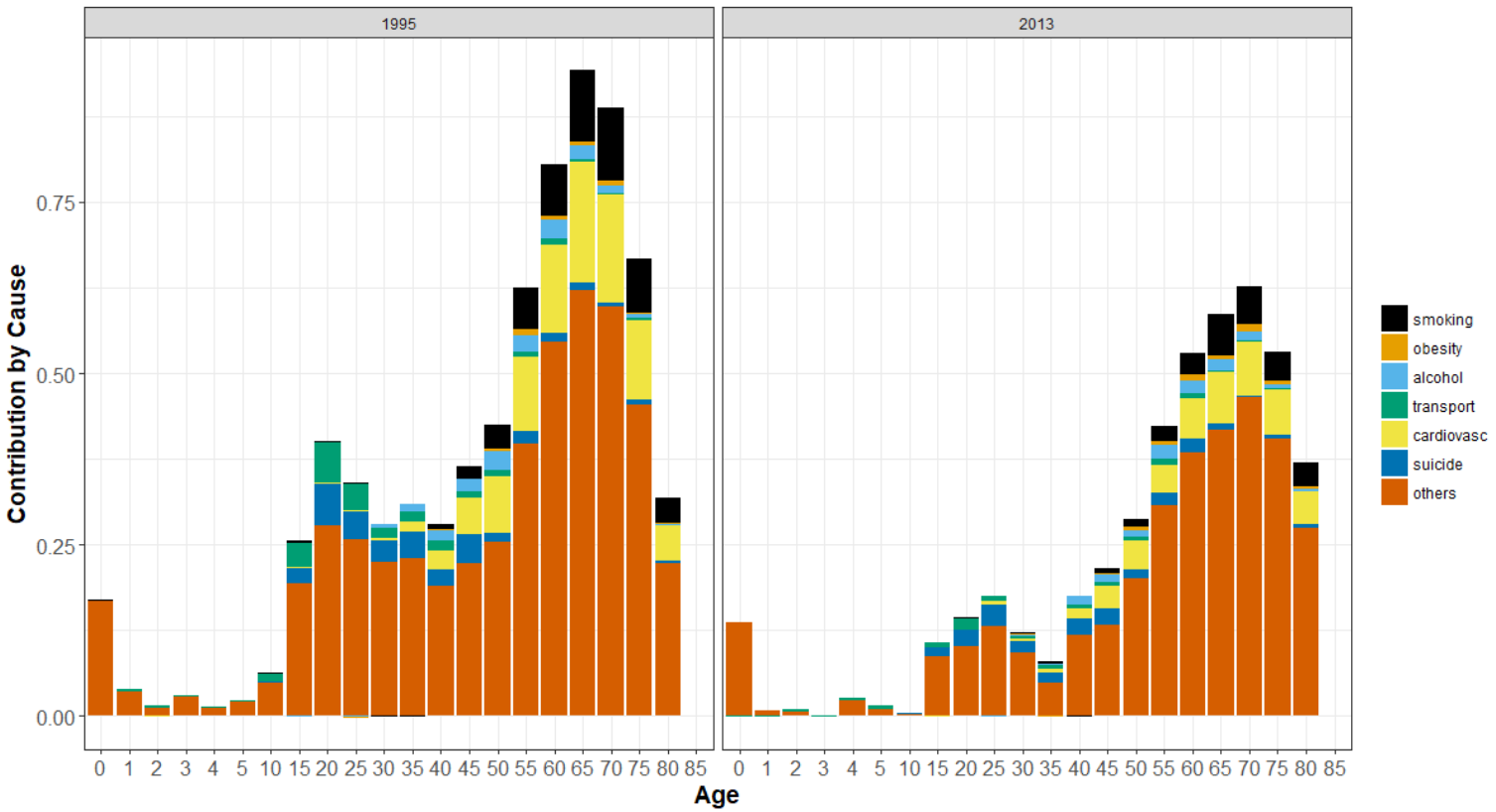


Figure: Step-wise replacement decomposition of life expectancy at birth by age and cause of death for the years 1995 and 2013 (Switzerland)

Age - CoD Decomposition of $e^{\dagger}$

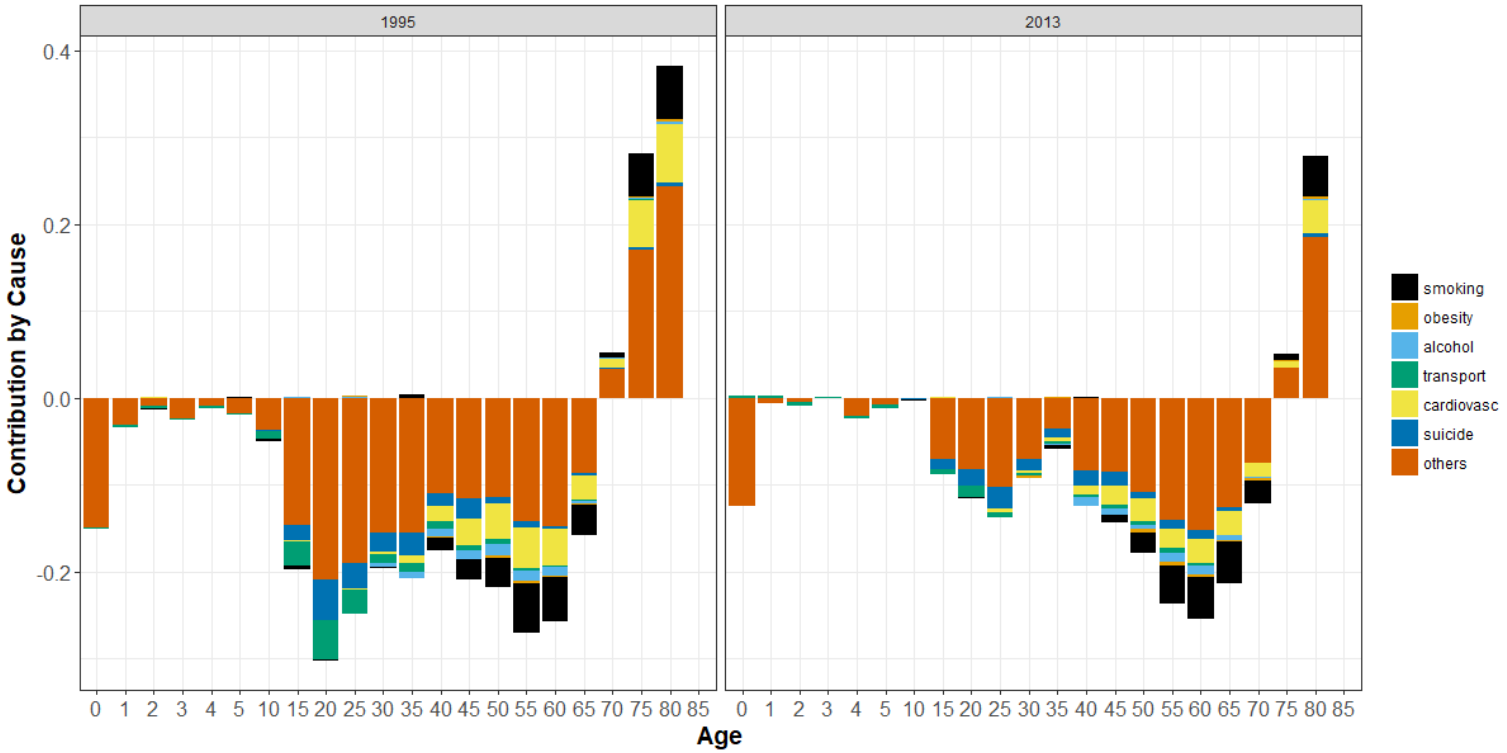


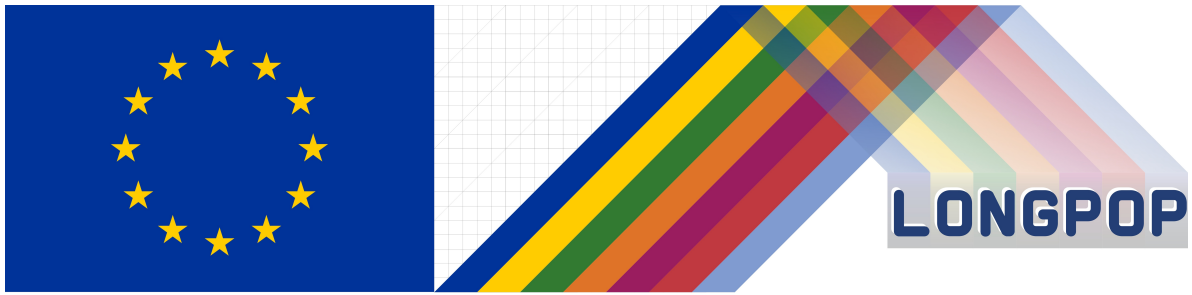
Figure: Step-wise replacement decomposition of $e^{\dagger}$ by age and cause of death for the years 1995 and 2013 (Switzerland)

- Reduction of sex-specific gaps in e_0 and life span disparity
- Majority of causes associated with the convergence remain unspecified
- Relative importance of smoking and alcohol related causes seems to decrease (cohorts?)

Outlook

The next steps...

1. Scale up - compare to other mortality regimes
2. Scale down - look at contributions of cantons/subpopulations
3. More causes - reduce the unexplained difference
4. Longer time series (ICD 8 CoDs)
5. Distinguish between initial difference and trends (contour decomposition)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 676060

Funding: This work was supported by the LONGPOP project which has received funding from the European Unions Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No 676060 and the project LONGHEALTH CSO2015-69834-R funded by the Spanish Ministry of Economy and Competitiveness.